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**COMMITTEE OF EXPERTS ON THE
TRANSPORT OF DANGEROUS GOODS**

**Sub-Committee of Experts on the
Transport of Dangerous Goods
(Fourteenth session,
Geneva, 8-18 December 1997,
agenda item 2 (d) and 4 (b))**

DRAFT AMENDMENTS TO THE MODEL REGULATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Other draft amendments

Physical hazards

Addition of a classification pathway identifier to the proper shipping name of organic peroxides

Transmitted by the Observer from New Zealand

Introduction

At the thirteenth session of the Sub-Committee New Zealand presented an informal paper INF.3. This paper outlined a number of concerns relating to the classification of Flammable and Reactive Substances in the proposed Globally Harmonised System. During the Working Group meeting, New Zealand was invited to present formal papers to the fourteenth session of the Sub-Committee.
New Zealand is currently developing Regulations for the Hazardous Substances and New Organisms (HSNO) Act. This Act implements the concepts and philosophy of the Globally Harmonised Chemical Classification System to New Zealand's Domestic Legislation. While developing these Regulations, we discovered some serious problems in applying the current UN transport classification criteria to the controls needed for worker, consumer and environmental safety.

The difficulty arises from the UN classification's use of packaging to modify the risk and thus the classification of Organic Peroxides and Self-Reactive substances. Workers and consumers will remove the Organic Peroxides or Self-Reactive Substances from the packaging. Thus the current UN classification system does not provide an adequate level of safety for these parts of the Organic Peroxides and Self-Reactive Substances lifecycle.

On careful examination of the classification flow chart (Figures 2.1 (a) and 2.2 (a) in the tenth revised edition) we have determined that there are a specific number of unique pathways through the flow chart for each exit point A to G.

New Zealand's Position re the Globally Harmonised Classification System

New Zealand strongly supports the creation of a Globally Harmonized Chemical Classification System. We also strongly support the Terms of Reference of the CG/HCCS. Our position is stated in ST/SG/AC.10/C.3/1997/68. This position is the same as the position presented in INF.3 at the thirteenth session on the Sub-Committee.

Proposal

That a unique pathway identifier be added to the Organic Peroxide and Self-Reactive Substances Proper Shipping Name. This will clearly indicate the inherent hazards associated with the specific Organic Peroxide or Self-Reactive Substance. These unique pathways are detailed in Annex.

There are

- Four (4) unique pathways through the flow chart which result in a Type A classification
- Seven (7) unique pathways through the flow chart which result in a Type B classification.
- Eleven (11) unique pathways through the flow chart which result in a Type C classification.
- Three (3) unique pathways through the flow chart which result in a Type D classification.
- Two (2) unique pathways through the flow chart which result in a Type E classification.
- Two (2) unique pathways through the flow chart which result in a Type F classification.
- One unique pathways through the flow chart which result in a Type G classification. Type G is also specified by the criteria for Organic Peroxides and Self-Reactive Substances.

We propose that the Proper Shipping Name for Organic Peroxides and Self-Reactive Substances are modified to include this unique pathway identifier. For example

ORGANIC PEROXIDE TYPE C, LIQUID, UN 3103

would become

ORGANIC PEROXIDE TYPE Cx, LIQUID, UN 3103, where **x** is the unique pathway identifier. For type C Organic Peroxides this would be a number between 1 and 11

Example

Figure 20.3 in the Tests and Criteria Manual, gives an example of the UN classification of **TERT-BUTYL PEROXY BENZOATE**. This is a **Organic Peroxide Type C, liquid, UN 3103.**

We will use this classification to illustrate the application of the proposed pathway identifier. Following through the flow chart and referencing the Type C table in Annex of this paper, results in the following classification.

Box in Flow Chart	**Possible pathways from Annex1**
Box 1 Partial Detonation	Types C5 or C6 or C7
Box 4 Slow or no deflargration	Type C7

After box 4 there are no other possible pathway choices which would result in a Type C classification Applying the pathway identifier the Proper Shipping Name now becomes:

Organic Peroxide Type C7, liquid, UN 3103

This Organic peroxide displays all the properties associated with row C7 in the table given in Annex 1.

Justification

This pathway identifier clearly identifies the properties of this Organic Peroxide both in the laboratory tests and in the packaged tests. In the above example this formulation of **TERT-BUTYL PEROXY BENZOATE** can be identified as having the following properties.

C7	Propagates a partial detonation UN t/s A	Propagates a slow deflagration UN t/s C	Violent effect when heated under defined confinement UN t/s E	Does not undergo a thermal explosion as confined UN t/s G

With this information readily available from the pathway identifier, appropriate safety measures can be taken in the workplace. The laboratory test results are significant as the modifying effect of packaging has been removed.

By adopting the pathway modifier

1. worker and consumer safety will be enhanced.

2. No new UN numbers need to be created.

3. There is minimal effect on the Marking, Labelling and Documentation required.

4. The need to make widely available the original test results is minimised as all the relevant information is readily available.

   (a) As the test results are immediately known from the pathway identifier, this will reduce the number of times the full test results will have to be submitted for Regulatory Approvals.

5. Hazard communication has been enhanced.

6. Minimum change has been made to the UN classification system.

Recommendation

The Committee is urged to adopt the proposed pathway identifier for Organic Peroxides and Self-Reactive Substances. This will ensure that the inherent hazards are clearly communicated. This will enable appropriate controls to be placed on these substances outside of the transport sector. In particular this will allow appropriate controls to be placed on these substances when packaging is not involved.

We strongly believe that the current UN classification is not workable when applied to the protection of workers, consumers and the environment, when these substances are not in packages.

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Annex

Proposed modification to UN Classification

UN Test Series H must be carried out on all OP's and Self-Reactive Substances to determine their Self Accelerating Decomposition Temperature (SADT).

Type A (4 possible combination of test results) redefined as:

A1	Propagates a detonation UN t/s A	Propagates a detonation as confined UN t/s B		
A2	Propagates a detonation UN t/s A	Does not propagate a detonation as confined UN t/s B	Propagates a rapid deflagration UN t/s C	Propagates a rapid deflagration as confined UN t/s D
A3	Propagates a partial detonation UN t/s A	Propagates a rapid deflagration UN t/s C	Propagates a rapid deflagration as confined UN t/s D	
A4	Does not propagate a detonation UN t/s A	Propagates a rapid deflagration UN t/s C	Propagates a rapid deflagration as confined UN t/s D	

Type B (7 possible combination of test results) redefined as:

B1	Propagates a detonation UN t/s A	Does not propagate a detonation as confined UN t/s B	Propagates a rapid deflagration UN t/s C	Does not propagate a rapid deflagration as confined UN t/s D	Violent effect when heated under defined confinement UN t/s E	Undergoes a thermal explosion as confined UN t/s G
B2	Propagates a detonation UN t/s A	Does not propagate a detonation as confined UN t/s B	Propagates a slow deflagration or no deflagration UN t/s C	Violent effect when heated under defined confinement UN t/s E	Undergoes a thermal explosion as confined UN t/s G	
B3	Propagates a partial detonation UN t/s A	Propagates a rapid deflagration UN t/s C	Does not propagate a rapid deflagration as confined UN t/s D	Violent effect when heated under defined confinement UN t/s E	Undergoes a thermal explosion as confined UN t/s G	
B4	Propagates a partial detonation UN t/s A	Propagates a rapid deflagration UN t/s C	Does not propagate a rapid deflagration as confined UN t/s D	Violent effect when heated under defined confinement UN t/s E	Undergoes a thermal explosion as confined UN t/s G	
B5	Does not propagate a detonation UN t/s A	Propagates a rapid deflagration UN t/s C	Does not propagate a rapid deflagration as confined UN t/s D	Violent effect when heated under defined confinement UN t/s E	Undergoes a thermal explosion as confined UN t/s G	

B6	Does not propagate a detonation UN t/s A	Propagates a slow deflagration UN t/s C	Violent effect when heated under defined confinement UN t/s E	Undergoes a thermal explosion as confined UN t/s G		
B7	Does not propagate a detonation UN t/s A	Does not propagate a deflagration UN t/s C	Violent effect when heated under defined confinement UN t/s E	Undergoes a thermal explosion as confined UN t/s G		

Type C (11 possible combination of test results) redefined as:

C1	Propagates a detonation UN t s A	Does not propagate a detonation as confined UN t s B	Propagates a rapid deflagration UN t s C	Does not propagate a rapid deflagration as confined UN t s D	Violent effect when heated under defined confinement UN t s E
C2	Propagates a detonation UN t s A	Does not propagate a detonation as confined UN t s B	Propagates a slow deflagration or no deflagration UN t s C	Violent effect when heated under defined confinement UN t s E	
C3	Propagates a detonation UN t s A	Does not propagate a detonation as confined UN t s B	Propagates a rapid deflagration UN t s C	Does not propagate a rapid deflagration as confined UN t s D	Medium, low or no effect when heated under defined confinement UN t s E
C4	Propagates a detonation UN t s A	Does not propagate a detonation as confined UN t s B	Propagates a slow deflagration or no deflagration UN t s C	Medium, low or no effect when heated under defined confinement UN t s E	
C5	Propagates a partial detonation UN t s A	Propagates a rapid deflagration UN t s C	Does not propagate a rapid deflagration as confined UN t s D	Violent effect when heated under defined confinement UN t s E	Does not undergo a thermal explosion as confined UN t s G
C6	Propagates a partial detonation UN t s A	Propagates a rapid deflagration UN t s C	Does not propagate a rapid deflagration as confined UN t s D	Medium, low or no effect when heated under defined confinement UN t s E	
C7	Propagates a partial detonation UN t s A	Propagates a slow deflagration UN t s C	Violent effect when heated under defined confinement UN t s E	Does not undergo a thermal explosion as confined UN t s G	
C8	Does not propagate a detonation UN t s A	Propagates a rapid deflagration UN t s C	Does not propagate a rapid deflagration as confined UN t s D	Violent effect when heated under defined confinement UN t s E	Does not undergo a thermal explosion as confined UN t s G
C9	Does not propagate a detonation UN t s A	Propagates a rapid deflagration UN t s C	Does not propagate a rapid deflagration as confined UN t s D	Medium, low or no effect when heated under defined confinement UN t s E	
C10	Does not propagate a detonation UN t s A	Propagates a slow deflagration UN t s C	Violent effect when heated under defined confinement UN t s E	Does not undergo a thermal explosion as confined UN t s G	
C11	Does not propagate a detonation UN t s A	Does not propagate a deflagration UN t s C	Violent effect when heated under defined confinement UN t s E	Does not undergo a thermal explosion as confined UN t s G	

Type D (3 possible combination of test results) redefined as:

D1	Propagates a partial detonation UN t/s A	Propagates a slow deflagration or no deflagration UN t/s C	Medium, low or no effect when heated under defined confinement UN t/s E
D2	Does not propagate a detonation UN t/s A	Propagates a slow deflagration UN t/s C	Medium, low or no effect when heated under defined confinement UN t/s E
D3	Does not propagate a detonation UN t/s A	Does not propagate a deflagration UN t/s C	Medium effect when heated under defined confinement UN t/s E

Type E (2 possible combination of test results) redefined as:

E1	Does not propagate a detonation UN t/s A	Does not propagate a deflagration UN t/s C	Low or no effect when heated under defined confinement UN t/s E	Not intended to be stored or transported in bulk	
E2	Does not propagate a detonation UN t/s A	Does not propagate a deflagration UN t/s C	Low or no effect when heated under defined confinement UN t/s E	Intended to be stored or transported in bulk	Explosive power not low UN t/s F

Type F (2 possible combination of test results) redefined as:

F1	Does not propagate a detonation UN t/s A	Does not propagate a deflagration UN t/s C	Low or no effect when heated under defined confinement UN t/s E	Intended to be stored or transported in bulk	Explosive power not low UN t/s F	Low effect when heated under defined confinement UN t/s E
F2	Does not propagate a detonation UN t/s A	Does not propagate a deflagration UN t/s C	Low or no effect when heated under defined confinement UN t/s E	Intended to be stored or transported in bulk	Explosive power low UN t/s F	

Type G — 1 Path Eleven unique pathways through the flow chart which result in a Type D classification

G1	Does not propagate a detonation UN t s A	Does not propagate a deflagration UN t s C	Low or no effect when heated under defined confinement UN t s E	Intended to be stored or transported in bulk	Explosive power not low UN t s F	No effect when heated under defined confinement UN t s E
G2	By Definition OP's with low available oxygen					